Two-Vertex Method For Alignment Crosscheck in BPIX movements

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A follow up to the studies presented in this talk, (slide 16)

http://indico.cern.ch/getFile.py/access?contribId=13&sessionId=5&resId=0&materialId=slides&confId=80951

Datasets

- /MinimumBias/Commissioning10-Jun14thReReco_v1/RECO (GR_R_36X_V12A)
  - May 17th: 135575
- /JetMETTau/Run2010A-Jun14thReReco_v2/RECO (GR_R_36X_V12A)
  - June 6th (5th from Run Registry): 137027, 137028
- /JetMETTau/Run2010A-PromptReco-v4/RECO (GR10_P_V7)
  - June 25th: 138560-138572
  - July 5th: 139399-139458
  - July 9th: 139779-139790
  - July 12th: 139965-139980
  - July 13th: 140058-140076
  - July 14th: 140119-140158
  - July 18th: 140379-140399

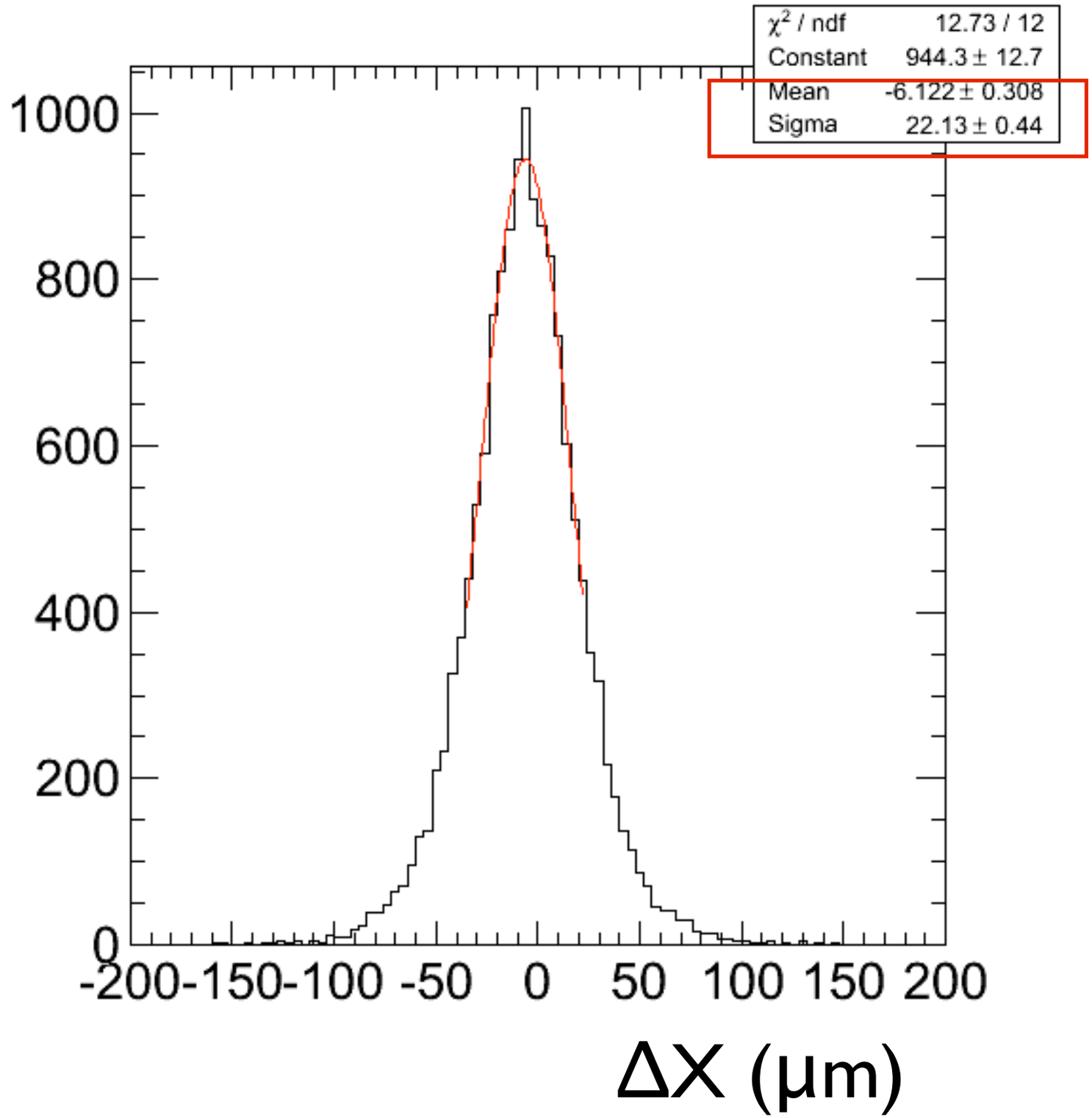
Workflow of Two-Vertex Method

- Select events with leading primary vertex* ndof > 4
- Split the tracks associated with the leading primary vertex
  - +X: $|\Phi| < \pi/2$ -X: $|\Phi| > \pi/2$
- Fit the two split track sets with the "offlinePrimaryVertices"
- Analyze the difference in the fit PV position on event base
- For each event, select the split vertices with nTracks > 20
  - Residual: $\Delta Z = Z(+X) - Z(-X)$
- For each run, fit ΔZ distribution with single gaussian, the fit range is ±RMS from the mean
- Log the fit mean as the bias and the sigma as the resolution

*Leading primary vertex: the first vertex in the primary vertex collection, by default this is the one with largest sum pT^2

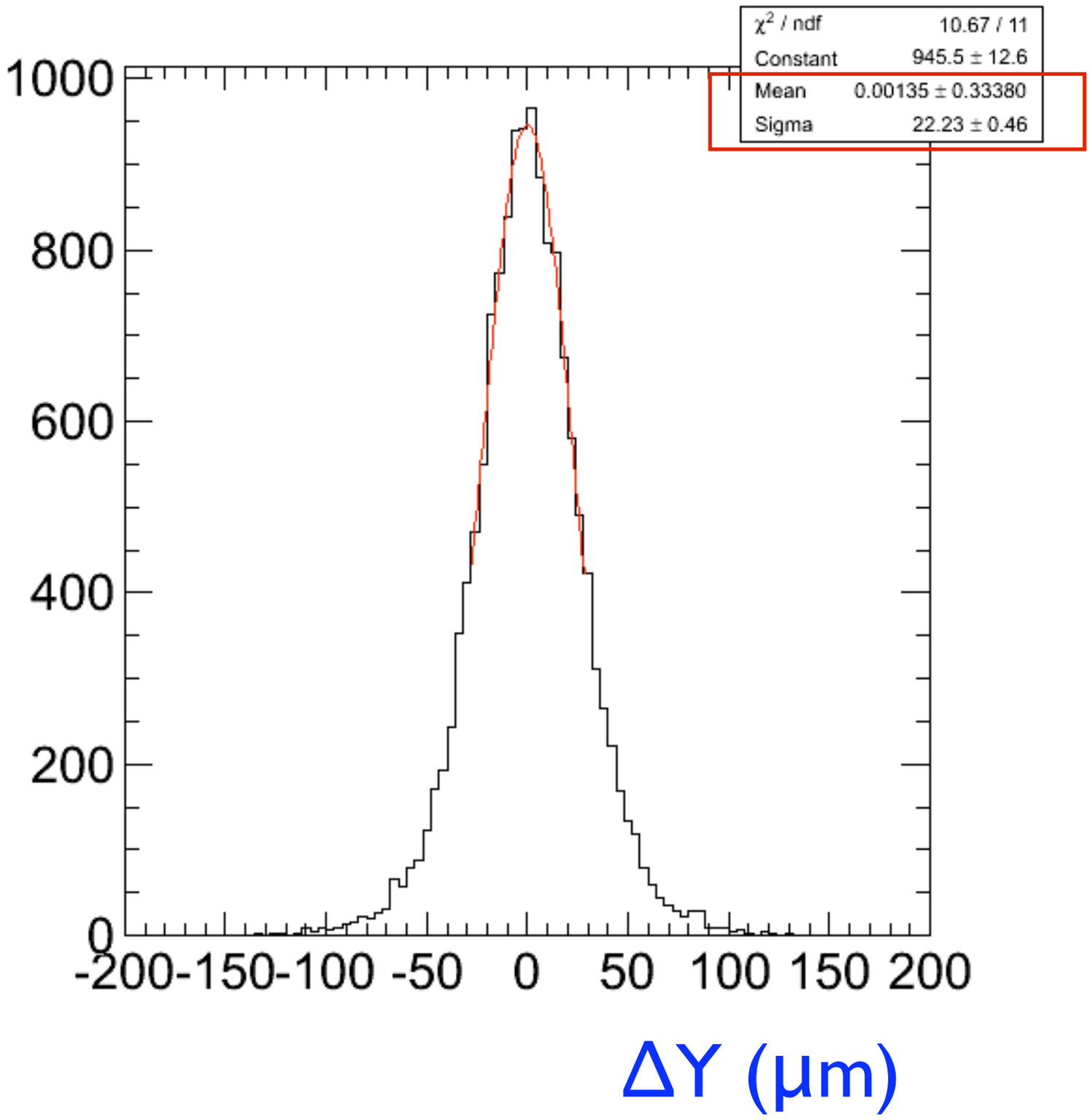
ΔX Fit in One Run

- Run 140387



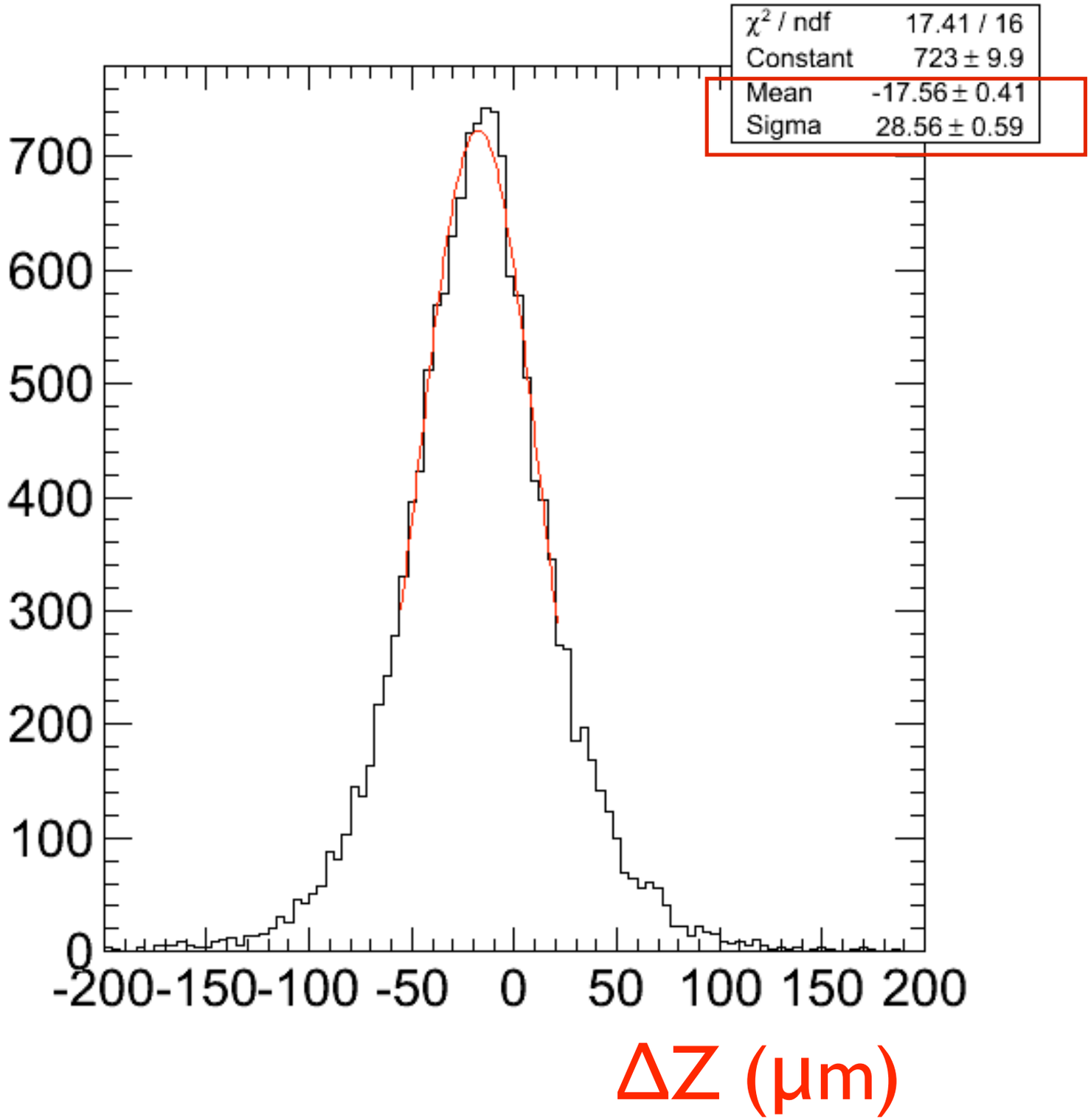
ΔY Fit in One Run

- Run 140387

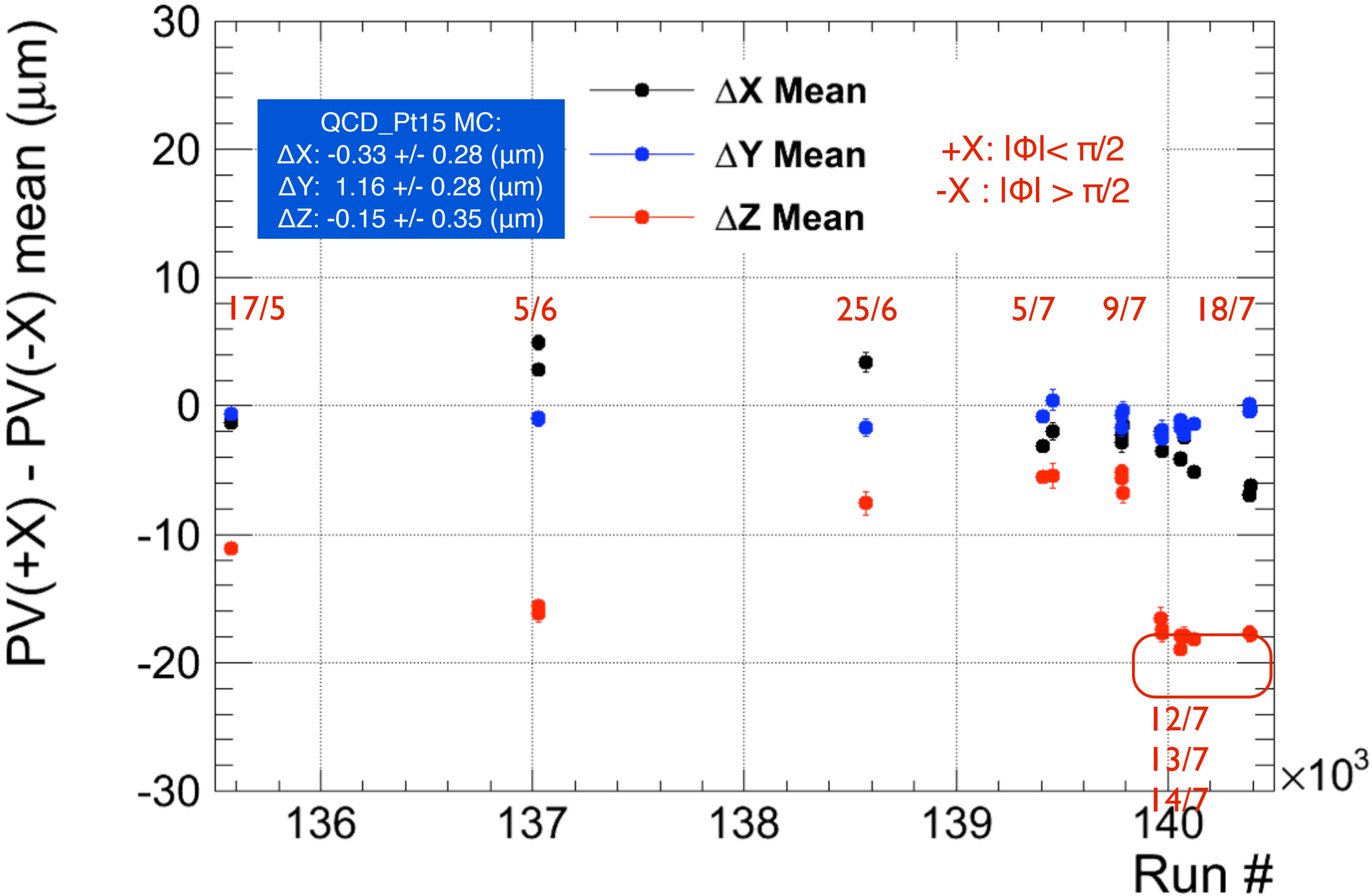


ΔZ Fit in One Run

- Run 140387

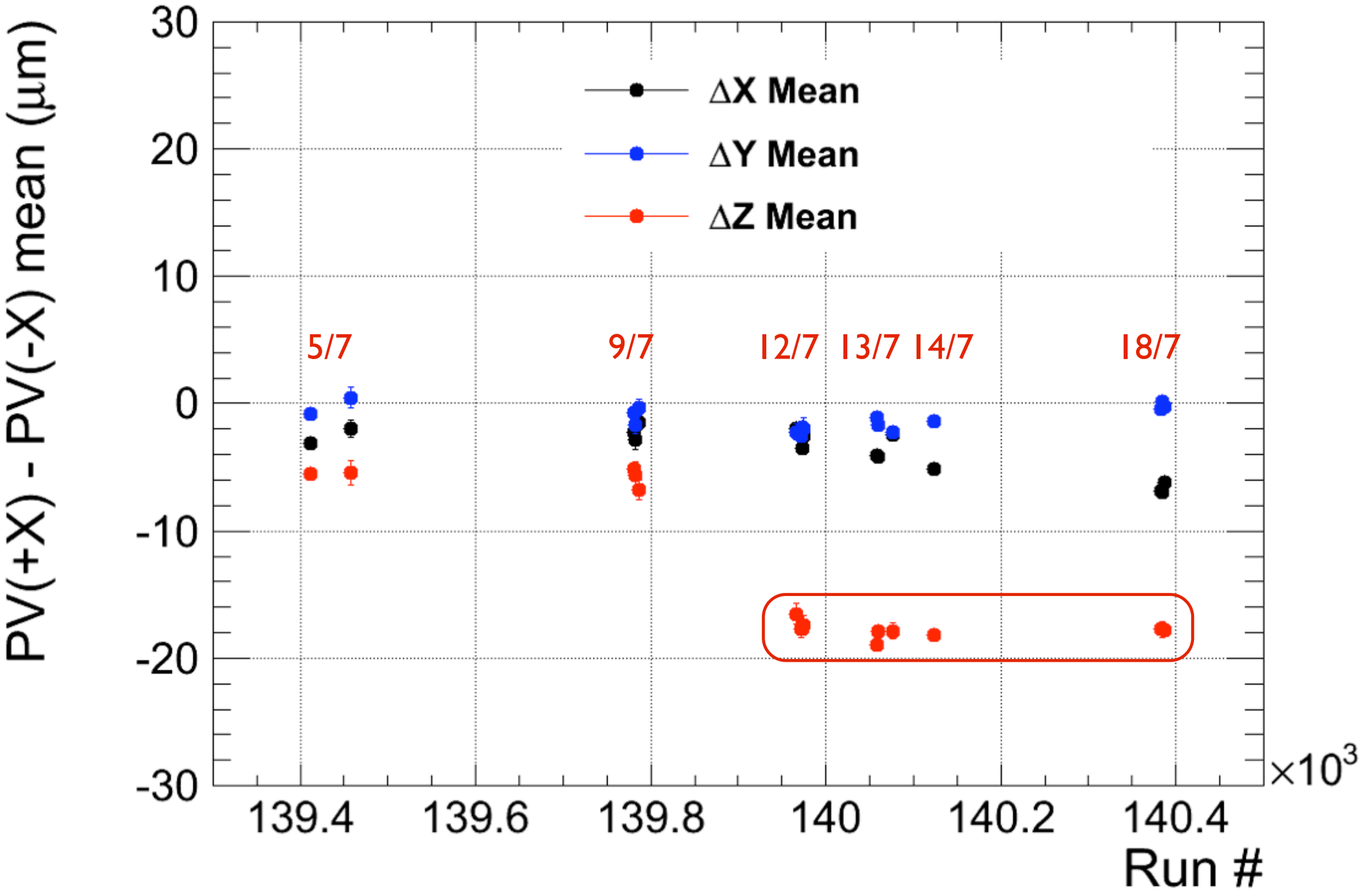


Residual Bias Vs Run



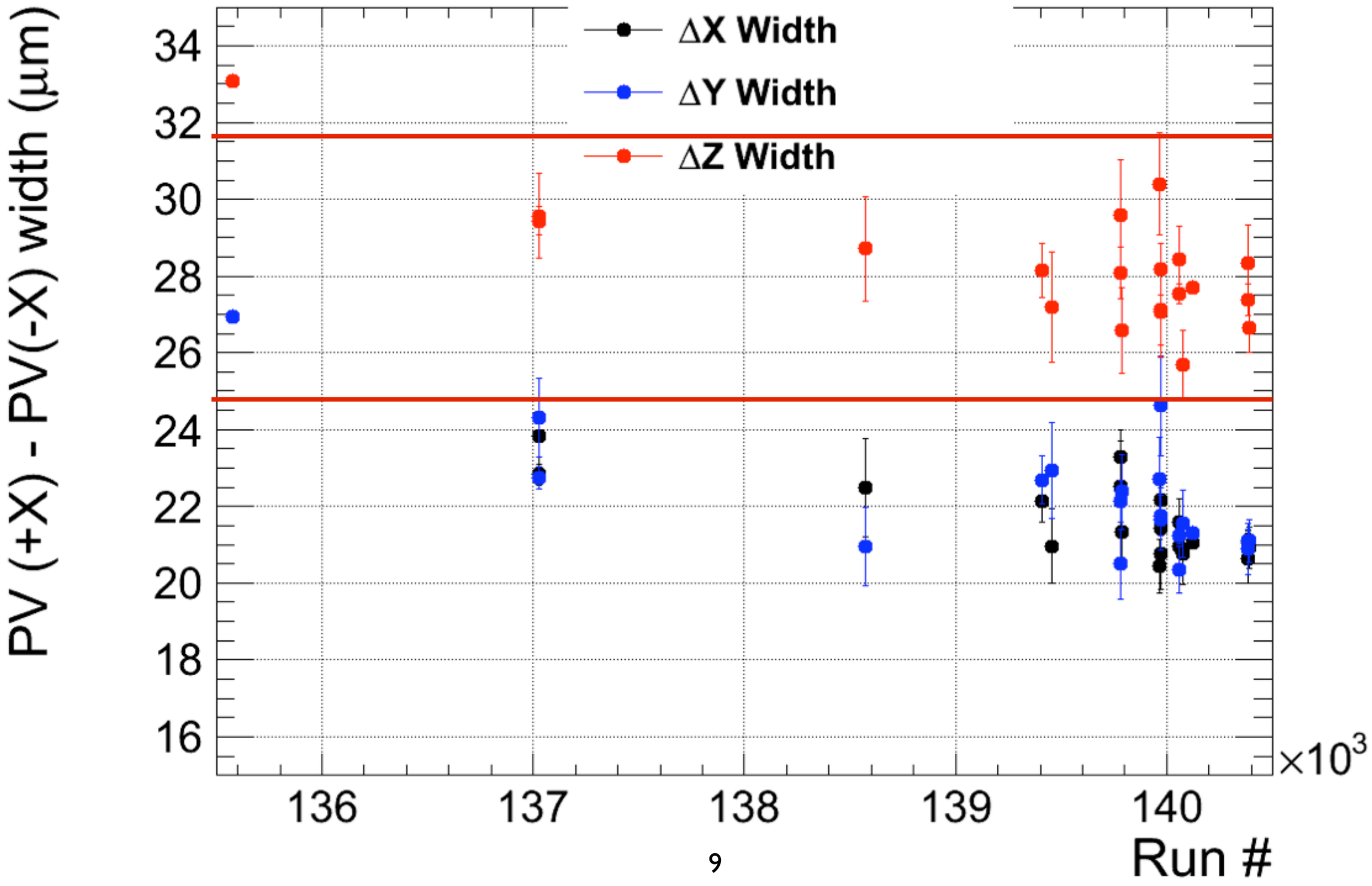
The observed trend confirmed the results from PV residual validation

Residual Bias Vs Run (zoom view)



Resolution vs Run

- Fairly stable with fluctuations within ~ 5μm
  - 1st point is using the MinBias, while the rest are using the JetMETTau



Residual Bias Vs Run - Split By Y